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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TATSUYA YASUNAGA,
HISASHI MITAMURA, and TAKENORI NAKAYAMA

Appeal 2008-2177
Application 10/790,019
Technology Center 1700

Decided: June 30, 2008

Before CHARLES F. WARREN, PETER F. KRATZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* WARREN.

Opinion Concurring filed by *Administrative Patent Judge* TIMM

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

Applicants appeal to the Board from the decision of the Primary Examiner finally rejecting claims 1 and 3 through 10 in the Office Action mailed September 11, 2006. 35 U.S.C. §§ 6 and 134(a) (2002); 37 C.F.R.

§ 41.31(a) (2006).

The appeal was heard May 22, 2008.

We affirm the decision of the Primary Examiner.

Claims 1 and 10 illustrate Appellants' invention of a composite material prepared by bonding rubber to a brass surface, and is representative of the claims on appeal:

1. A composite material prepared by bonding rubber to the surface of a brass-plated material obtained by plating the surface of a substance with brass or to the surface of a brass material by vulcanization,

wherein needle-like Cu-S-based reaction products are formed at the bonding interface between brass and rubber,

wherein preheating is carried out at 80 to 120°C before vulcanization,

wherein when the section of the bonding interface between brass and rubber is observed through a transmission electron microscope, 1 to 50 needle-like Cu-S-based reaction products having a length L of 10 nm or more and a ratio of the length L to the width W (L/W) of 5 or more are existent based on 1 μm in the length of the section of the bonding interface.

10. The rubber-bonded brass composite material according to claim 1, wherein a preheating time before vulcanization ranges from 2 to less than 20 minutes.

The Examiner relies upon the evidence in these references (Ans. 3):

Shemenski	US 4,446,198	May 1, 1984
Heishi	US 4,974,654	Dec. 4, 1990
Sha[1,2]	JP 2002-096403 A	Apr. 2, 2002

[1] We refer to the translation of Sha prepared for the USPTO by The McElroy Translation Company (PTO 08-1756 January 2008) and provided to Appellants in the Office Communication entered February 12, 2008.

[2] This reference is referred to as "Takayama" in the Briefs and the Answer, but we find that this name does not appear in the USPTO translation or in the Japan Patent Office translation and the Derwent Abstract which are also of record,

Blow, Rubber Technology and Manufacture, 296, 399-400 (CRC Press. 1975).

Appellants request review of the ground of rejection under 35 U.S.C. § 103(a) advanced on appeal: claims 1 and 3 through 10 over Sha in view of Heishi, Shemenski, and Blow. Ans. 3; App. Br. 3.

Appellants argue the claims as a group based on claim 1 and further present separate argument with respect to each of claims 5, 6, and 10. App. Br. 3-9. Thus, we decide this appeal based on claim 1 and on claims 5, 6, and 10 to the extent argued in the Briefs. 37 C.F.R. § 41.37(c)(1)(vii) (2006).

The principal issue in this appeal is whether the Examiner has carried the burden of establishing a prima facie case of obviousness which, of course, turn on the issues addressed below.

The plain language of independent claim 1, couched in product-by-process format, specifies a composite material prepared by preheating any composite material of any rubber material and any brass-surfaced material to a temperature of 80 to 120°C before vulcanization by any method to bond the rubber material to the brass-surfaced material. The preheating step is conducted for a time sufficient so that at least 1 and at most 50 needle-like Cu-S-based reaction products per 1 μm having the claimed dimensions are formed at the rubber-brass bonding interface during vulcanization. The composite material is claimed to the extent that 1 to 50 needle-like Cu-S-based reaction products per 1 μm are formed. Dependent claims 5 and 6 limit the number of needle-like Cu-S-based reaction products formed to 2 to 40 and 3 to 30, respectively. Dependent claim 10 limits the preheating time to a range of 2 to less than 20 minutes, which period is sufficient to form at

least 1 and at most 50 needle-like Cu-S-based reaction products during vulcanization. *See, e.g., In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985) ((citing, *inter alia*, *In re Brown*, 459 F.2d 531, 535 (CCPA 1972) ("product-by-process claims are limited by and defined by the process"); *In re Pilkington*, 411 F.2d 1345, 1348 (CCPA 1969)).

We find Sha would have disclosed to one of ordinary skill in this art, with reference to Figure 3, a method of vulcanizing an unvulcanized tire W in which heated cap tread T is glued to carcass C, and simultaneously therewith or thereafter, the metal wire part of bead part Wa is preheated to, for example, a temperature of 80-120°C by electromagnetic induction heating means 5 generating heat in the metal wires. Sha, e.g., ¶¶ 0006, 0012-0015, and 0017-0020. The unvulcanized tire is preheated at that temperature range "so that unvulcanized tire W is heated to a prescribed temperature (for example 60-100°C) uniformly along the circumference." Sha ¶ 0018. Preheated unvulcanized tire W is then "immediately" transferred from molding machine 2 directly to connected vulcanizing machine 1 for vulcanization. Sha, e.g., ¶¶ 0006, 0011, 0019, and 0022, and Fig. 1. Bead part Wa is preheated because it is the part of the tire where vulcanization occurs most slowly, thus providing unvulcanized tire W with a heated bead part and a heated cap tread T that avoids overvulcanization of tire parts and reduces conventional vulcanization time by 10-20%. Sha, e.g., ¶¶ 0003, 0005-0008, and 0019-0023.

We find Shemenski provides evidence that it was known in the art that

> generally steel wire reinforcement elements are coated with brass in order to facilitate rubber-metal adhesion. It is generally agreed by those skilled in the art that adhesion of rubber to

> brass-plated steel wire is dependent upon a bond between the copper in the brass and sulfur in the rubber. When such brass coated steel reinforcing elements are present in the rubber composition during vulcanization, it is believed that bonds between the rubber and steel reinforcement gradually form due to a chemical reaction between the brass alloy and the rubber at the interface forming a bonding layer. At some point in the vulcanization procedure a maximum number of bonds is obtained. After this maximum is achieved the number of bonds present begins to decrease, probably by secondary reactions which decompose the layer. Subsequent to vulcanization and during the further lifetime of the steel reinforced article, these reactions continue at much lower rates by heat aging, for example, in a running tire, and this together with oxidative degradation of the rubber itself, contributes to further destruction of the bond.

Shemenski col. 1, ll. 24-45.

Shemenski provides further evidence that it was known in the art that

> [t]he temperature and duration of vulcanization must be well adapted to the metallic-coating in order to maximize rubber to metal adhesion.
>
> As a general rule, vulcanization temperatures in excess of 163°C (325°F) are detrimental to good rubber to brass adhesion. Thus, high temperature cure cycles have traditionally resulted in poor rubber to metal adhesion. For this reason high temperature cure cycles have not normally been employed to vulcanize rubber articles containing brass coated steel elements as reinforcements.
>
> The amount of time needed to cure a rubber article decreases with increasing cure temperatures. Thus, by increasing cure temperatures, cure cycles can be reduced in duration. It is, therefore, possible to reduce the amount of time required in manufacturing vulcanized rubber articles by utilizing higher cure temperature.

Shemenski col. 1, ll. 45-61.

We find Shemenski would have disclosed to one of ordinary skill in this art, a ternary brass alloy coated steel wire useful in the reinforcement of rubber articles, such as the reinforcement of vehicle tires, wherein the ternary brass coating contains a major amount of copper, a minor amount of zinc, and a smaller amount of iron. Shemenski, e.g., Abstract and col. 2, ll. 18-31 and 43-58. Shemenski discloses that rubber articles provided with the reinforcing wire "can be cured at high temperatures while maintaining excellent rubber to metal adhesion." Shemenski col. 1, l. 62 to col. 2, l. 17. A composite of rubber surrounding the ternary brass alloy coated steel wire can be cured by vulcanization, wherein the uncured rubber normally contains various compounding ingredients including sulfur. Shemenski e.g., col. 3, ll. 16-27, and col. 4, l. 62 to col. 5, l. 10. Shemenski illustrates the vulcanization of sulfur containing rubber/ternary brass alloy coated steel wire composites with curing temperatures of 163°C (325°F) for 16 minutes and 177°C (350°F) for 8.5 minutes, with adhesion of the coated wire in the rubber demonstrated by subjecting the wire to a pull-out test according to ASTM Standard D2229-73. Shemenski col. 5, l. 20 to col. 6, l. 66.

We find Heishi would have disclosed to one of ordinary skill in this art evidence that it was known in the art that the difference between the modulus of elasticity of steel cords and that of rubber in a tire for a motor vehicle is large, resulting in a shearing force that separates the steel cord from the rubber in the absence of brass plating on the steel cord that would "heighten the sticking power between the rubber and the steel cord." Heishi col. 1, ll. 14-27. Heishi would have disclosed to one of ordinary skill in this art that where steel cord in which each set of wire elements are plated with

brass consisting of a major amount of copper and a minor amount of zinc is used in a tire, the non-plated cut ends of the cord are arranged in a manner to diminish the difference between the elasticity of the uncoated cut ends and the rubber in the tire. Heishi, e.g., col. 1, 61 to col. 2, l. 32, col. 3, ll. 51-57, and Fig. 3.

We find Blow would have disclosed to one of ordinary skill in this art evidence that it was known in the art to use brass plated iron and steel wire, wherein copper is the major component of the brass, as reinforcing wire in tires as the brass bonds with the rubber during vulcanization. Blow 296, 399, and 400.

Appellants acknowledge that "a technique for bonding rubber to a brass-plated material obtained by subjecting the surface of a substrate to wet type brass plating by vulcanization is widely employed to improve adhesion between a metal material as the substrate and rubber" and is illustrated by "bonding of a brass-plated steel wire to rubber for the manufacture of an auto tire." Spec. 1. "[T]he improvement of adhesion to rubber is based on the proceeding of a chemical bonding reaction (crosslinking reaction) between copper (Cu) contained in the brass plating layer and sulfur (S) contained in the rubber," and "[t]herefore, it is requisite to the improvement of adhesion that the reaction between the copper and sulfur is realized in as large an area as possible." Spec. 2; *see also* App. Br. 8:20 to 9:2.

Appellants acknowledge the use of brass surfaced wire as "bead wires for tires" which have a reinforcing function. Spec. 4:2-4 and 10:10-16.

Appellants disclose that a transmission electron microscope (TEM) is used to determine the presence and characteristics of needle-like Cu-S based reaction products. Spec., e.g., 3:21 to 4: 1, 5:25 to 6:5, and 11:24 to 12:6.

Appellants illustrate their invention with 14 Examples wherein "a general steel cord for tires (thickness of brass plating: about 0.2 μm) . . . buried in a rubber material (ordinary tire rubber based on natural rubber)" according to ASTM D2229 "was preheated at 100°C for 0 (no preheating) [in Example 1] to 26 minutes [by 2 minute intervals in Examples 2-14] and vulcanized at 160°C for 15 minutes to be bonded." Spec. 11-12 and Table 1; App. Br. 5. "A drawing test based on the above ASTM system is known as a standard test for the evaluation of adhesion between a steel yarn stock and rubber" and was used to determine "initial adhesion of the . . . vulcanized bonded material (composite maternal) right after vulcanization and the long-term adhesion of the composite material . . . [subjected to a wet environment] 72 hours after vulcanization." *Id.* The bonding interface of the bonding layer after vulcanization was observed by TEM to "count the number of needle-like Cu-S based reaction products existent based on 1 μm in the length of the bonding interface" falling in the claimed length and aspect ratio ranges and determine an average number based on 10 1 μm positions. Spec. 11-12. The results reported in Table 1 show that the tested composites exhibited an increase in initial and long-term adhesion at Example 3 (4 minutes preheating time and 1.2 average needle-like Cu-S based reaction products), and continued to increase until Example 11 (18 minutes preheating time and 45.5 average needle-like Cu-S based reaction products) with a decrease in adhesion thereafter. Appellants

disclose that the Examples establish that ranges of needle-like Cu-S based reaction products, as claimed in claims 1, 5, and 6, indicate "excellent adhesion to rubber" while the number of reaction products outside the claimed ranges, as in Examples 2 and 11-14, "have the same or lower bonding strength than a composite material obtained without preheating," as in Example 1. Spec. 12-13.

We find no data in Specification Table 1 or other disclosure in the Specification which describes the characteristics of the brass-surfaced wire – rubber interface at the end of any preheating step.

We determine the combined teachings of Sha, Shemenski, Heishi, and Blow, the scope of which we determined above, provide convincing evidence supporting the Examiner's case that the claimed invention encompassed by claims 1, 5, 6, and 10, as we interpreted these claim above, would have been prima facie obviousness to one of ordinary skill in the tire manufacturing arts familiar with methods for preparing tires.

We agree with the Examiner that one of ordinary skill in this art would have practiced Sha's method of vulcanizing an unvulcanized tire with brass-surfaced bead wire after preheating the bead area of the tire by electromagnetic induction heating of the bead wire. Ans. 3. In this respect, we agree the Examiner that this person would have been motivated to use brass-surfaced bead wire in view of the knowledge in the art that brass-surfaced wire chemically reacts with rubber forming a bonding layer, thus providing adhesion between the brass-surfaced wire and the rubber, as evinced by Shemenski, Heishi, and Blow, and as acknowledged by Appellants. Ans. 3-4 and 5-6. Indeed, Shemenski evinces it was known in

the art that the copper in the brass surface reacts with the sulfur in the rubber to form Cu-S bonds at the interface providing adhesion, which is also acknowledged by Appellants. Heishi evinces that a wire without a brass surface does not provide sufficient adhesion with the rubber because of differences in the modulus of elasticity, leading to a shearing force that separates the wire from the rubber, reducing tire durability. Thus, we determine that one of ordinary skill in this art would have used brass-surfaced wire as the bead wire in the tire to increase adhesion and avoid shearing forces in the bead area as suggested by Shemenski and Heishi. In any event, Appellants acknowledge that bead wire is a known reinforcing wire. Thus, this person would have selected brass-surfaced wire for this purpose.

Accordingly, we are of the opinion that prima facie, one of ordinary skill in the art routinely following the combined teachings of Sha, Shemenski, Heishi, and Blow would have reasonably practiced Sha's method with a tire that contains brass-surfaced bead wires in view of the teachings of Shemenski, Heishi, and Blow as well as Appellants' acknowledgments in the reasonable expectation of obtaining a tire that has good adhesion between the bead wire and the rubber in the composite tire material. *See, e.g., KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1739 (2007)(a patent claiming a combination of elements known in the prior art is obvious if the improvement is no more than the predictable use of the prior art elements according to their established functions); *see also, e.g., In re Translogic Tech.*, 504 F.3d 1249, 1260 (Fed. Cir. 2007) ("[A] flexible approach to the TSM test prevents hindsight and focuses on evidence before

the time of invention without unduly constraining the breadth of knowledge available to one of ordinary skill in the art during the obviousness analysis." (citations omitted)); *In re Kahn*, 441 F.3d 977, 985-88 (Fed. Cir. 2006); *In re O'Farrell*, 853 F.2d 894, 903-04 (Fed. Cir. 1988)("For obviousness under § 103, all that is required is a reasonable expectation of success." (citations omitted)); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)(("[T]he test [for obviousness] is what the combined teachings of the references would have suggested to those of ordinary skill in the art."); *In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (skill is presumed on the part of one of ordinary skill in the art).

We further agree with the Examiner that, prima facie, the Cu-S bonded composite product resulting from practicing Sha's method with an unvulcanized tire, that has brass-surfaced bead wire, by preheating the bead area via the bead wire at a temperature within the range of 80-120°C, reasonably appears to be identical or substantially identical to the claimed composite material encompassed by claim 1 even though the applied prior art does not explicitly disclose or suggest that such composite products would have at least 1, 2, or 3 needle-like Cu-S-based reaction products as specified in claims 1, 5, and 6. Ans. 4-5 and 6-7.

In this respect, we determine that one of ordinary skill in this art would have recognized from Sha's teachings that the bead area should be preheated within the disclosed temperature range for the period of time necessary for build up of sufficient heat so that the heat is retained in the bead area until immediate vulcanization in the vulcanizing machine in order to obtain the disclosed benefits of reduced vulcanization time and reduced

overvulcanization of other tire parts. Thus, we agree with the Examiner that the time this person would preheat the unvulcanized tire reasonably falls within the range of from 2 to less than 20 minutes specified in claim 10. Ans., e.g., 4. In this respect, one of ordinary skill in this art would have been armed with the knowledge of vulcanizing methods applicable to unvulcanized tires containing brass-surfaced wire as evinced by Shemenski and acknowledged by Appellants.

Accordingly, the burden shifts to Appellants to establish by argument and/or objective evidence that the claimed composite material patentably distinguishes over the prior art even though the ground of rejection is based on § 103(a). *See, e.g., In re Best*, 562 F.2d 1252, 1255-56 (CCPA 1977) ("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. *See In re Ludtke*, [441 F.2d 660 (CCPA 1971)]. Whether the rejection is based on 'inherency' under 35 U.S.C. § 102, on 'prima facie obviousness' under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products." (footnote and citation omitted)); *cf., e.g., In re Spada*, 911 F.2d 705, 708-09 (Fed. Cir. 1990)("The Board held that the compositions claimed by Spada 'appear to be identical' to those described by Smith. While Spada criticizes the usage of the word 'appear,' we think that it was reasonable for the PTO to infer that the polymerization by both Smith and Spada of identical monomers,

employing the same or similar polymerization techniques, would produce polymers having the identical composition.").

The fact that Appellants specify a certain physical property of the CU-S reaction product not disclosed by the prior art does not alone patentably distinguish over the reference. *See, e.g., Spada*, 911 F.2d at 708 ("Products of identical chemical composition can not have mutually exclusive properties. *See In re Papesch*, 315 F.2d 381, 391, 137 USPQ 43, 51 (CCPA 1963) (a chemical compound and its properties are inseparable)."); *In re Skoner*, 517 F.2d 947, 950-51 (CCPA 1975) ("Appellants have chosen to describe their invention in terms of certain physical characteristics. . . . Merely choosing to describe their invention in this manner does not render patentable their method which is clearly obvious in view of [the reference]." (Citation omitted)).

Upon reconsideration of the record as a whole in light of Appellants' contentions, we are of the opinion that Appellants have not successfully rebutted the prima facie case. Appellants contend the purpose of the bead wire in Sha's process appears to be a part of the heating means for the bead area and thus, even if obvious to coat the wire with brass, the reference does not recognize the preheating step as a result-effective variable with respect to increasing adhesion between rubber and brass. App. Br. 5-6, and 9. In this respect, appellants further contend that the size and number of needle-like Cu-S-based reaction products are based not only on the preheating temperature range but also on the time of preheating. Thus, Appellants argue the claimed composite materials are the result of more than following the suggestions of the prior art wherein "a time greater than 20 minutes or a

time less than two minutes could also be within the terms of [Sha's] preheating." App. Br. 7-8, and 9; *see also* 3-5.

Appellants further contend the data reported in Specification Table 1 demonstrates "an improvement when the preheating time is between 2 and <20 minutes [as claimed in claim 10] for a preheating temperature of 100°C," from which "it is clear that depending on the preheating temperature [claimed in claim 1], . . . the actual preheating times to arrive at 1 to 50 needle-like Cu-S-based reaction products will be different." Reply Br. 1-2. Appellants argue "[t]his effect is clearly not recognized by the applied prior art" and would not "have been expected without the present specification as a guide" because in the absence of a recognition of the needle-like reaction product in the art, "one of ordinary skill in the art [would not] know when to stop preheating in order not to exceed the 50 needle-like reaction product limitation." Reply Br. 2.

We disagree with Appellants' unsupported contention with respect to the bead wire in Sha's unvulcanized tires because we find no evidence in the record contradicting Appellants' admission that bead wire, including brass-plated bead wire, is used in tires or the knowledge in the art that brass-surfaced wire is used in tires to avoid the deleterious result of shearing forces when uncoated wire is used.

Appellants' contentions reflect the claimed invention encompassed by claims 1, 5, and 6 which specify at least a preheat time to the extent that preheating of a composite of any brass-surfaced material and any rubber within the specified temperature range can be conducted for a time sufficient to obtain needle-like Cu-S-based reaction product(s) within the claimed

ranges with any vulcanizing method, and by claim 10 which specifies a product wherein the needle-like reaction product(s) must be prepared using the specified temperature and time ranges. The difficulty we have with Appellants' position is that while the prior art does not disclose that at least one needle-like Cu-S-based reaction product is obtained by Sha's preheating step, regardless of wire, rubber, preheating time and vulcanization conditions, and thus, the exact conditions under which such reaction product(s) is/are obtained, neither does claims 1, 5, 6, and 10. In this respect, Appellants only disclose in their Specification the data reported in Specification Table 1 for a specific combination of wire, rubber, and preheating and vulcanizing conditions. Indeed, Appellants disclose that the presence of the needle-like reaction products can only be determined through observation by TEM after preheating at the specified temperature. In this respect, the data in Specification Table 1 does not evince an "improvement" over Sha's vulcanized tire because there is no showing that the tire prepared by Sha's method would not exhibit the same properties.

Thus, on this record, we are not persuaded by Appellants' contentions that one of ordinary skill in this art would not have reasonably arrived at the claimed product encompassed by the claims by routinely following Sha's method, which includes a preheating step at the claimed temperature and would reasonably be conducted for a time that would fall within the range of specified in claim 10, simply because the prior art does not recognize the claimed reaction product property. Indeed, Sha in combination with Shemenski, Heishi, and Blow and further in view of the knowledge in the art acknowledged by Appellants, suggest doing what Appellants have done

even if Sha utilizes the preheating step for a different purpose, *see, e.g., In re Kronig,* 539 F.2d 1300, 1304 (CCPA 1976) ("[I]t is sufficient here that [the reference] clearly suggests doing what appellants have done."); *see also In re Kemps*, 97 F.3d 1427, 1429-30 (Fed. Cir, 1996), citing *In re Dillon*, 919 F.2d 688, 693 (Fed. Cir. 1990) (*en banc*), and does not disclose the claimed needle-like reaction product.

In the latter respect, it is well settled that Appellants' discovery of a new property of a product or elucidation of a previously unrecognized structure of a product does not render the old product again patentable simply because those practicing the product may not have appreciated the property or the structure. *See, e.g., Spada*, 911 F.2d at 707; *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990); *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 782-83 (Fed. Cir. 1985); *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983) ("[I]t is . . . irrelevant that those using the invention may not have appreciated the results[,] . . . [otherwise] it would be possible to obtain a patent for an old and unchanged process. [Citations omitted.]"); *Skoner*, 517 F.2d at 950-51.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Sha, Shemenski, Heishi, and Blow with Appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 and 3 through 10 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The Primary Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

TIMM, *Administrative Patent Judge*, concurring,

In my view the critical question on appeal is: Have Appellants met their burden in overcoming the Examiner's reasonable belief that when one of ordinary skill in the art conducted the process of Sha, including the preheating step, the claimed 1-50 needle-like Cu-S based reaction products would inherently result? *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977) (where the Examiner has reason to believe that a claimed property may, in fact, be an inherent characteristic of the prior art product, an examiner possesses the authority to require applicant to prove that the subject matter shown to be in the prior art does not in fact possess the property.).

The Examiner has established that Sha describes preheating the bead part Wa of an unvulcanized tire by induction heating the metal wire within the bead part with induction meaning means 5, the temperature range suggested by Sha being identical to the range Appellants disclose results in the 1-50 needle-like reaction products they claim (Ans. 3; Sha ¶¶ 0006, 0014, 0018, and Fig. 3). The Examiner has also established that, conventionally, the "metal wire" within pneumatic tires, is a brass plated wire, the brass reacting to produce Cu-S reaction products that enhance adhesion and, therefore, that is the type of wire one of ordinary skill in the art would use in Sha (Ans. 3-4). The Examiner further finds that it is reasonable to believe that following the teachings of Sha results in performing preheating for a duration that would necessarily result in the claimed needle-like reaction products (Ans. 4).

Appellants rely upon Table 1 of their Specification which shows that, for preheat temperatures of 100°C, preheating times of between 4 and somewhat less than 20 minutes are required to obtain the claimed needle-like reaction products (Br. 4-6). Appellants contend that the preheating time of Sha would not necessarily be within the 4 to 20 minute range (Br. 8).

Given that Sha describes heating the bead wire to 80-120°C in order to heat the bead part Wa to 60-100°C, it is reasonable to believe the time required to perform Sha's preheating would be the same or substantially the same as that required to obtain needle-like reaction products. For instance, where the preheat temperature was 100°C it is reasonable to believe a time of 2 and 20 minutes would be required to raise the temperature of the unvulcanized rubber in the bead part of Sha from ambient to 60-100°C.

I note that the Examiner has no reasonable method of verifying that the time duration is, in fact, within the range required, therefore, the burden shifts to Appellants to show that preheating as taught by Sha would, in fact, not necessarily result in the claimed 1-50 needle-like reaction products claimed. *Best*, 562 F.2d at 1255. Appellants' unsupported assertion that the duration of time required by Sha *might* be longer than 20 minutes is insufficient (Br. 4-5; Reply Br. 1-2). Appellants have provided no objective evidence that the time duration one of ordinary skill in the art would perform Sha's preheating would be, in fact, outside the range required. *See Best*, 562 F.3d at 1255 (holding Best's showing on cool down rate insufficient because it did not show that the cool-down rate, for a typical laboratory-scale sample when employed in Hansford's process, would not yield a cooled zeolite with

the claimed X-ray diffraction pattern, it only showed that cooling rates might vary depending on apparatus and quality of zeolite treated).

For the above reasons, Appellants have not convinced me that the Examiner reversibly erred, nor have Appellants met their burden in rebutting the Examiner's reasonable conclusion of inherency. Therefore, I concur in the decision of my colleagues.

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